



Taxonomic notes and faunistic data on the Muscidae (Diptera) of the Altai Mountains (Russia)

NIKITA E. VIKHREV^{1,3} & VERA S. SOROKINA²¹Zoological Museum of Moscow University, Bolshaya Nikitskaya str. 2, Moscow 125009, Russia²Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze str. 11, Novosibirsk 630091, Russia. E-mail: sorokinavs@mail.ru³Corresponding author. E-mail: nikita6510@ya.ru

Abstract

The Muscidae fauna of the Altai Republic, Russia, is discussed, and 28 species are newly recorded for the region. Six species (*Hydrotaea hsiai* Fan, 1965, *Hydrotaea unispinosa* Stein, 1898, *Thricops aduncus* Savage, 2003, *Helina bispinosa* Malloch, 1920, *Helina obtusipennis* (Fallén, 1823), *Coenosia demoralis* Hockett, 1965) are newly recorded for Russia. Three of these species (*T. aduncus*, *H. bispinosa* and *C. demoralis*) are newly recorded for the Palaearctic region. A description of the hitherto unknown female of *Xestomyia atrox* Sorokina & Pont, 2011 and redescriptions of *Coenosia demoralis* Hockett, 1965 and *Hydrotaea hsiai* Fan, 1965 are given. One new synonym is proposed: *Phaonia fusca* Meade, 1897 = *Phaonia suspiciosa* Stein, 1907, **syn. nov.**

Key words: New synonymy, new records, Altai Mountains, fauna, taxonomy, Russia

Introduction

There are two federal areas of Russia named as “Altai”: the Altai Kray (literally ‘Altaiskiy Kray’ in Russian) and the Altai Republic (literally ‘Respublika Altai’, formerly known as the Gorno-Altai Autonomous Region because of the Altai Mts). These mountains also extend into Kazakhstan, China and Mongolia. The Altai Republic is entirely, and the Altaiskiy Kray is partly, mountainous, so the term “Altai Mountains” needs to be defined. In recent publications (Sorokina 2012a, Sorokina & Pont 2011), under the term “Altai Mountains” the authors implied the territory of the present Altai Republic only. The present paper is also devoted exclusively to the Altai Republic. Such a narrow sense of the term has its advantages and disadvantages, but at least it permits to compare between the present data and earlier records.

While there is only scanty information on most of the Siberian regions of Russia, the Muscidae fauna of the Altai Republic is rather well studied. Based on 6 years of field research in the Altai Mountains, V. Sorokina (2012a) listed 184 species for this region (this paper is in open access here: www.zin.ru/societies/res/rus/periodicals/horae/83-1.pdf).

After this, a further twenty species of Muscidae were recorded from the Altai Mountains (including 12 species newly described from this region). They are as follows: *Hydrotaea barkalovi* Sorokina & Pont, 2011, *Xestomyia atrox* Sorokina & Pont, 2011, *Spilogona humeralis* Hockett, 1965 (Sorokina 2012b), *Coenosia tschernovi* Sorokina, 2014, *Azelia monodactyla* Loew, 1874, *Azelia triquetra* (Wiedemann, 1817) (Vikhrev 2015a), *Drymeia acrostichalis* Sorokina & Pont, 2015, *Drymeia alpicola* (Rondani, 1871), *Drymeia cilitarsis* Sorokina & Pont, 2015, *Drymeia fasciculata* (Stein, 1916), *Drymeia firthiana* (Hockett, 1965), *Drymeia glabra* Sorokina & Pont, 2015, *Drymeia grandis* Sorokina & Pont, 2015, *Drymeia grisea* Sorokina & Pont, 2015, *Drymeia longiseta* Sorokina & Pont, 2015, *Drymeia puchokana* Sorokina & Pont, 2015, *Drymeia quadrisetosa* (Malloch, 1919), *Drymeia setibasis* (Hockett, 1965), *Drymeia sibirica* (Hennig, 1962), *Drymeia trisetata* Sorokina & Pont, 2015 (Sorokina & Pont 2015). One species, *Drymeia gymnophthalma* (Hennig, 1963), listed from the Altai Mountains

(Sorokina 2012a) was excluded from the list (Sorokina & Pont 2015). Thus a total of 203 Muscidae species was previously recorded from the Altai Republic.

A three-week collecting trip by the first author in 2016 and the determination of some previously collected specimens by the second author have added 28 more species to the fauna of Muscidae of the Altai Republic and have raised the Muscidae list to 231 species.

The present paper consists of two parts: *List of new records of Muscidae from the Altai Mountains*, with short remarks where necessary, and *Taxonomic section*, where the new synonymy of *Phaonia fusca* Meade, 1897 = *Phaonia suspiciosa* Stein, 1907, **syn. nov.** is proposed, the description of the hitherto unknown female of *Xestomyia atrox* Sorokina & Pont, 2011 and redescriptions of *Coenosia demoralis* Hockett, 1965 and *Hydrotaea hsiiai* Fan, 1965 are given.

Material and methods

The specimens examined in this study are deposited in the following museums:

CNC—Canadian National Collection of Insects, Ottawa, Canada;

ISEA—Institute of Systematics and Ecology of Animals, Novosibirsk, Russia;

ZIN—Zoological Institute, St Petersburg, Russia;

ZMUM—Zoological Museum of Moscow University, Russia.

Geographical coordinates are given in the Decimal Degrees format. The following generally accepted abbreviations for morphological structures are used: *f1*, *t1*, *f2*, *t2*, *f3*, *t3* = fore, mid, hind femur or tibia respectively; *ac*—acrostichal setae; *dc*—dorsocentral setae; *a*, *p*, *d*, *v* = anterior, posterior, dorsal, ventral seta(e). The abbreviation for the tarsi as *tar* followed by a pair of digits separated by a hyphen was proposed by Vikhrev (2011): the first digit (1 to 3) gives the leg number and the second digit (1 to 5) the number of the tarsal segment. For example, *tar1-4* = 4th segment of fore tarsus; *tar3-1* = hind basitarsus. Illustrations are original unless otherwise indicated.

The classification follows that in the *Catalogue of Palaearctic Diptera* (Pont 1986). The species are listed in the same order as in the Catalogue.

Results

List of new records of Muscidae from the Altai Mountains

Azelia aterrima (Meigen, 1826)

Material examined. RUSSIA: *Altai Republic*: 3♂, Seminskiy Pass, Turala River valley, 50.99°N 85.68°E, 1350 m asl, 8–13.07.2016, leg. N. Vikhrev; 7♂, Seminskiy Pass env., Sarlyk R, 51.11°N 85.60°E, 1200 m asl, 28–30.06.2016, leg. N. Vikhrev (all in ZMUM).

Distribution. Palaearctic: Eurasian; Oriental: Vietnam.

Thricops aduncus Savage, 2003

Fig. 1G

Material examined. RUSSIA: *Altai Republic*: 2♂ 2♀, Seminskiy Pass, 51.05°N 85.59°E, 1650 m asl, 27–30.06.2016, leg. N. Vikhrev; 1♂, Seminskiy Pass, Turala River valley, 50.99°N 85.68°E, 1350 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Remarks. *Thricops aduncus* Savage, 2003 was described from a male holotype and several female paratypes from NW Canada (Yukon, Alberta, British Columbia) and Alaska. All the Altai specimens were collected on forest

edges from Umbelliferae inflorescences together with the much more common (about 20:1) *Thricops longipes* (Zetterstedt, 1845). The male of *Thricops aduncus* is unmistakable due to its modified hind leg. Females from the Altai runs to *Thricops aduncus* in Savage's key (Savage 2003) and fits the description which, however, does not mention the dilated palpi. We re-examined female paratypes of *Thricops aduncus* in the CNC and found that the female palpi are distinctly broader than in male. This uncommon character among the *Thricops* species makes identification of the female of *Thricops aduncus* easier and more reliable.

Distribution. New record for Palaearctic: Russia (Altai Mts). Nearctic: Canada (Yukon Territory, British Columbia, Alberta), USA (Alaska).

***Thricops diaphanus* (Wiedemann, 1817)**

Material examined. RUSSIA: *Altai Republic*: 1♂, Seminskiy Pass, 51.05°N 85.59°E, 1650 m asl, 27–30.06.2016, leg. N. Vikhrev (ZMUM); 1♂, 10 km NE of Bargash, Mukhorcherga village, 51.34°N 85.31°E, 1550 m asl, 22.07.2011, leg. V. Sorokina (ISEA).

Distribution. Holarctic and N of Oriental region.

***Thricops foveolatus* (Zetterstedt, 1845)**

Material examined. RUSSIA: *Altai Republic*: 1♂ 1♀, Seminskiy Pass, Turala River valley, 50.99°N 85.68°E, 1350 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Other record: RUSSIA: 3♂ 13♀, *Krasnodar* reg., Lagonaki, 44.011°N 40.033°E, 1500 m asl, horse dung, 10–13.06.2012, leg. N. Vikhrev (ZMUM).

Remarks. An uncommon species. According to our observations in the Altai and Caucasus Mountains, both sexes are attracted to horse dung.

Distribution. Palaearctic.

***Hydrotaea atrisquama* Ringdahl, 1925**

Material examined. RUSSIA: *Altai Republic*: 23♂ 5♀, Seminskiy Pass, Turala River valley, 50.99°N 85.68°E, 1350 m asl, 8–13.07.2016, leg. N. Vikhrev; 1♂, Seminskiy Pass env., Sarlyk River valley, 51.11°N 85.60°E, 1200 m asl, 28–30.06.2016, leg. N. Vikhrev (ZMUM).

Remarks. Vikhrev (2015b) suggested that *Hydrotaea atrisquama* Ringdahl, 1925 has a more northern distribution than the taxonomically and ecologically related *Hydrotaea parva* Meade, 1889. Records of both species in the Altai Mountains have confirmed this suggestion: *Hydrotaea atrisquama* was collected at elevations from 1200 to 1350 m asl, whereas *Hydrotaea parva* was found only at 360 to 840 m asl. Both species are attracted to horse dung.

Distribution. Palaearctic: mostly in northern and eastern parts; Oriental: N Myanmar.

***Hydrotaea cyrtoneurina* (Zetterstedt, 1845)**

Material examined. RUSSIA: *Altai Republic*: 1♂, Onguday env., 50.77°N 86.09°E, 840 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic and North of Oriental region.

Hydrotaea glabricula (Fallén, 1825)

Material examined. RUSSIA: *Altai Republic*: 1♀, Onguday env., 50.77°N 86.09°E, 840 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic.

Hydrotaea hsiai Fan, 1965

Material examined. RUSSIA: *Altai Republic*: 1♀, Kosh-Agach env., 50.0°N 88.6°E, 1750 m asl, 2–4.07.2016, leg. N. Vikhrev (ZMUM).

Other records: MONGOLIA: 1♂, *Tov* prov.: Central Aimak, NW environs of Ulan-Bator (47.9°N 106.7°E), 11.06.1967, leg. V. Zaitsev; 3♂, 20 km S of Ulan-Bator (47.7°N 106.9°E), 2.07.1967, leg. V. Zaitsev; 6♀, 70 km S of Ulan-Bator (47.3°N 106.7°E), 20–21.07.1967, leg. V. Zaitsev. *Dundgovi* prov.: 1♀, Sredne-Gobiyskiy Aimak, Delgertsogt (46.13°N 106.37°E), 22.07.1967, leg. V. Zaitsev; 1♂, Delgerkhangai Mountains (45.24°N 104.80°E), 25.07.1967, leg. V. Zaitsev (all in ZIN).

Distribution. Known from arid regions of Central Asia: China (Qinghai). Newly recorded here from Mongolia and Russia (Altai Republic).

See Taxonomic part.

Hydrotaea parva Meade, 1889

Material examined. RUSSIA: *Altai Republic*: 14♂ 1♀, Ust-Sema env., 51.6°N 85.8°E, 360 m asl, 21–26.06.2016, leg. N. Vikhrev; 2♂, Onguday env., 50.77°N 86.09°E, 840 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic: mostly in southern and western parts.

Hydrotaea tuberculata Rondani, 1866

Material examined. RUSSIA: *Altai Republic*: 1♂, Ulagansky district, Iolgu River valley, 50.08°N 88.96°E, 2000 m asl, on *Euphorbia* flowers, 18.06.2005, leg. V. Sorokina (ISEA).

Other records: AZERBAIJAN: 1♂, Lankaran district, Khanbulan (38.66°N 48.78°E), 19.10.2008, leg. N. Vikhrev (ZMUM) (new record for the country). RUSSIA: 1♂, *Amur* reg., 40 km W of Svobodny (51.46°N 127.59°E), 27.07.1958, leg. Gerasimova (ZIN); 1♂, *Astrakhan* reg., Baskunchak salt-lake, 48.193°N 46.813°E, 2–4.05.2010, leg. K. Tomkovich; 1♂, *Buryatia* reg., Baisa, 53.95°N 113.60°E, 28.06.1969, leg. V. Zherikhin; 1♂ 1♀, *Irkutsk* reg., Ust-Kut env., 56.8°N 105.8°E, 25.07.1979, leg. G. Veselkin; 1♂, *Magadan* reg., Sokol env., 59.92°N 150.71°E, 11–19.07.2014, leg. N. Vikhrev; 1♂ 1♀, *Mordovia* reg., Mordovsky NR, 54.8°N 43.3°E, pasture, 30.06.1982, leg. G. Veselkin (all in ZMUM).

Remarks. *Hydrotaea tuberculata* Rondani, 1866 is a widespread but not very common species. The new records for Russia listed above show that compared to the related *Hydrotaea hsiai* Fan, 1965 this species is distributed in the more humid and northern parts of Asia.

Distribution. Holarctic.

Hydrotaea unispinosa Stein, 1898

Material examined. RUSSIA: *Altai Republic*: 1♂, Seminskiy Pass, Turala River valley, 50.99°N 85.68°E, 1350 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Other records: RUSSIA: 1♂, *Moscow* reg., Ruza env., 55.66°N 36.05°E, 1–10.06.2016, leg. E. Erofeeva (ZMUM); 1♂ 1♀, *Primorsky* reg., Kedrovaya Pad National Reserve (Primorsky env., 43.1°N 131.5°E), 17–19.08.1962, leg. E. Nartchuk (ZIN).

Remarks. The taxonomy and distribution of *Hydrotaea unispinosa* Stein, 1898 was discussed in Vikhrev & Gomyranov (2014). It is an uncommon but remarkably widespread species. This species is known from: Nearctic, Canada and USA from East to West between 40°N and 50°N; Oriental, foothills in the northern part of the ecozone, India: Uttarakhand and West Bengal regions, Nepal, Thailand, Chiang Mai region; Vietnam, Lai Chau region; Palaearctic: Europe (Sweden); Asia (China, Liaoning region). The record from the Altai Republic and the two further localities given above are the first findings of this species in Russia.

Distribution. Holarctic and Oriental.

***Polietes steinii* (Ringdahl, 1913)**

Material examined. RUSSIA: *Altai Republic*: 3♂ 3♀, Ust-Sema env., 51.6°N 85.8°E, 360 m asl, 21–26.06.2016, leg. N. Vikhrev; 2♂, Seminskiy Pass env., Sarlyk River valley, 51.11°N 85.60°E, 1200 m asl, 28–30.06.2016, leg. N. Vikhrev; 3♂, Seminskiy Pass, Turala River valley, 50.99°N 85.68°E, 1350 m asl, 8–13.07.2016, leg. N. Vikhrev (all in ZMUM); 1♂ 5♀, 20 km SW of Cherga, Verkh-Kukuya village, 51.46°N 85.28°E, 950 m asl, 17.07.2011, leg. V. Sorokina (ISEA).

Remarks. Reputedly not a common species, but it is actually common on horse dung from European Russia to the Russian Far East. In the Altai Mountains *Polietes steinii* (Ringdahl, 1913) was found on horse dung from 360 to 1350 m asl. The closely related *Polietes major* (Ringdahl, 1926) is also attracted to horse dung but was recorded at higher altitudes, from 1200 to 2600 m asl.

Distribution. Palaearctic.

***Phaonia atrocyanea* Ringdahl, 1916**

Material examined. RUSSIA: *Altai Republic*: 1♀, Seminskiy Pass, 51.05°N 85.59°E, 1650 m asl, 27–30.06.2016, leg. N. Vikhrev (ZMUM).

Distribution. Holarctic. Palaearctic: Norway, Sweden, Russia (Nenets AO, Taymyr Pen., Altai Mts). Nearctic: Canada (Yukon Territory, NWT, Labrador, Quebec), USA (Alaska).

***Phaonia falleni* Michelsen, 1977**

Material examined. RUSSIA: *Altai Republic*: 2♀, Ust-Sema env., 51.6°N 85.8°E, 360 m asl, 21–26.06.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic.

***Phaonia magnicornis* (Zetterstedt, 1845)**

Material examined. RUSSIA: *Altai Republic*: 1♂, Onguday env., 50.77°N 86.09°E, 840 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic, Nearctic: Alaska, Yukon.

***Helina bispinosa* Malloch, 1920**

Material examined. RUSSIA: *Altai Republic*: 1♂, Kosh-Agach env., 50.01°N 88.6°E, 1750 m asl, 2–4.07.2016, leg. N. Vikhrev (ZMUM).

Distribution. New for Palaearctic: Russia (Altai Mts). Nearctic: Canada (British Columbia, Alberta), USA (California, N Mexico).

***Helina daicles* (Walker, 1849)**

Material examined. RUSSIA: *Altai Republic*: 1♂ 1♀, Seminskiy Pass, Turala River valley, 50.99°N 85.68°E, 1350 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic: Finland, Norway, Russia (Europe, W Siberia), Sweden.

***Helina maculipennis* (Zetterstedt, 1845)**

Material examined. RUSSIA: *Altai Republic*: 2♂ 1♀, Ulagansky district, Iolgu River valley, 50.08°N 88.96°E, 2000 m asl, 18.06.2005, leg. V. Sorokina (ISEA); 3♂, Seminskiy Pass, 51.05°N 85.59°E, 1650 m asl, 27–30.06.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic, Nearctic.

***Helina obtusipennis* (Fallén, 1823)**

Material examined. RUSSIA: *Altai Republic*: 1♂, Sebalino district, Ilinka env., Gladkikh Mt., 1308 m asl, 51.45°N 85.12°E, 19.07.2011, leg. V. Sorokina; 3♂ 1♀, Belog-Mykhor-Cherga Mt. env., 1767 m asl, 51.32°N 85.30°E, 22.07.2011, leg. V. Sorokina (all in ISEA).

Distribution. Palaearctic: Europe, Asia: Turkey, Russia (Altai Mts).

***Gymnodia polystigma* (Meigen, 1826)**

Material examined. RUSSIA: *Altai Republic*: 1♂ 1♀, Ust-Sema env., 51.6°N 85.8°E, 360 m asl, 21–26.06.2016, leg. N. Vikhrev (ZMUM).

Remarks. This species is attracted to horse dung.

Distribution. Palaearctic.

***Mydaea detrita* (Zetterstedt, 1845)**

Material examined. RUSSIA: *Altai Republic*: 1♂, Sebalino district, Cherga env., 770 m asl, 51.58°N 85.53°E, 21.07.2011, leg. V. Sorokina (ISEA).

Distribution. Palaearctic, Nearctic.

***Mydaea nebulosa* (Stein, 1893)**

Material examined. RUSSIA: *Altai Republic*: 1♀, Sebalino district, Cherga env., 516 m asl, 51.52°N 85.56°E, 16.07.2011, leg. V. Sorokina (ISEA).

Distribution. Palaearctic.

***Mydaea nubila* Stein, 1916**

Material examined. RUSSIA: *Altai Republic*: 1♂, Sebalino district, Cherga env., 517 m asl, 51.56°N 85.52°E, 16.07.2011, leg. V. Sorokina (ISEA).

Distribution. Palaearctic, Nearctic.

***Lispe longicollis* Meigen, 1826**

Material examined. RUSSIA: *Altai Republic*: 2♂ 2♀, Kosh-Agach env., 50.0°N 88.6°E, 1750 m asl, 2–4.07.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic.

***Lispe superciliosa* Loew, 1861**

Material examined. RUSSIA: *Altai Republic*: 1♂ 1♀, Kosh-Agach env., 50.0°N 88.6°E, 1750 m asl, 2–4.07.2016, leg. N. Vikhrev (ZMUM).

Distribution. Palaearctic.

***Coenosia demoralis* Hockett, 1965**

Material examined. RUSSIA: *Altai Republic*: 1♂, Kosh-Agach env., Aktru River, 50.1°N 87.8°E, 2050 m asl, 21.07.2013, leg. T. Novgorodova (ISEA); 1♂, Seminskiy pass, Sarlyk River, 51.11°N 85.60°E, 1200 m asl, 28–30.06.2016, leg. N. Vikhrev (ISEA); 7♂ 7♀, Seminskiy Pass, Turala River valley, 50.99°N 85.68°E, 1350 m asl, 8–13.07.2016, leg. N. Vikhrev (ZMUM).

Other records: RUSSIA: 1♂ 1♀, *Magadan* region, Ust-Omchug, 61.15°N 149.63°E, grove with *Chosenia arbutifolia*, 30.06.1971, leg. K. Gorodkov (ZIN).

Remarks. The series from Turala River was collected by sweeping in tall Gramineae grasses along the river.

Distribution. New for the Palaearctic: Russia (Altai Mts, Magadan region). Nearctic: Canada (Yukon Territory, Churchill, Manitoba, Quebec).

See Taxonomic part.

***Coenosia lacustris* Schnabl, 1926**

Material examined. RUSSIA: *Altai Republic*: 1 ♀, Sebalino district, Cherga env., 470 m asl, 51.56°N 85.56°E, 20.07.2011, leg. V. Sorokina (ISEA).

Distribution. Palaearctic: China (Shanxi), Japan (Honshu), Russia (Siberia, Far East).

***Coenosia kosterini* Vikhrev, 2009**

Material examined. RUSSIA: *Altai Republic*: 2♂, Kosh-Agach env., 50.0°N 88.6°E, 1750 m asl, 2–4.07.2016, leg. N. Vikhrev (ZMUM).

Other records: RUSSIA: *Altai Kray*, 1♂, Klyuchi, Klyuchevskoe Lake (52.255°N 79.160°E) bank, 20.06.2009, leg. O. Kosterin. MONGOLIA: 1♂, Uvs prov., Uvs Lake (49.99°N 92.75°E), 6.08.1970, leg. E. Nartchuk (ZIN).

Distribution. Palaearctic: Russia (Omsk, Altai Kray, Altai Republic regions), Mongolia (Uvs).

Taxonomic section

***Hydrotaea hsiai* Fan, 1965**

Fig. 1 C–F

Hydrotaea hsiai Fan, 1965: 87. Type locality: China, Qinghai prov., Haiyan distr. (≈37.0°N 100.8°E).

Descriptive notes: MALE (Fig. 1D), body length 4.5–5.5 mm.

Head: Eyes bare. Fronto-orbital plates touching, distance between eyes equal to diameter of anterior ocellus. Fronto-orbital plates glossy black in anterior half. Fronto-orbital plates with 8–9 pairs short inclinate setae from lunula to middle of frons. Antenna black, arista virtually bare.

Thorax: Glossy black, without any dusting. Chaetotaxy: strong *ac* absent, *ac* hairs long, in 6 rows; 2+4 *dc*; katepisternals 1+1, katepimeron bare; notopleuron with hairs on area between notopleural setae. Lower katepisternum ahead of mid coxa with usual setae reduced, but with a pair of clusters of 3 long slightly back-curved setae.

Wing: Hyaline, calypters white, haltere with black knob.

Legs: Black; *f1* with two typical ventral hooks at apex; *t1* with *pd* seta in apical 1/4; *f2* with about 10 strong and long *pv* setae (1.5–2x as long as femur width), 5 more sparsely placed setae in basal half and a cluster of 5 more approximated setae in apical half, medially with a bare gap between the two clusters of setae; on *av*-surface with 5–7 weaker setae in apical half; *t2* with 2 *p* and elongated hairs on *p* surface; *f3* with 4–5 long *av* in apical 1/3; *t3* with 2 *av*, 1 short *ad* and 1 *pd*. Mid tarsus modified: *tar2–1* in basal half ventrally with a cluster of 4–5 elongated spinulose setulae and 6–7 fine curved hairs.

Abdomen: Entirely glossy black with blue shine.

FEMALE (Fig. 1C) differs from male as follows: body length 4.5–5.0 mm; frons wide, frontal triangle glossy black, reaching middle of frons; fronto-orbital plates and upper parafacials glossy black; 3+3 elongated setae on lower katepisternum distinct, but weaker and shorter than in male; *f1* without hooks at apex; *f2* with only short setulae; *t2* without elongated hairs on *p* surface; mid tarsus not modified.

Remarks. *Hydrotaea hsiyai* Fan, 1965 was described long ago in Chinese (Fan, 1965) and the identity of this species has been unclear. The information given on *Hydrotaea hsiyai* in Xue, Wang & Du (2007) and Xue, Wang & Wang (2007) is fragmentary, contradictory and with errors. However, the combination of two uncommon characters (shining black body, with both thorax and abdomen without pollinosity, and modified *tar2–1*, with a tuft of setulae in subbasal part) convinces us that the specimens listed above belong to *Hydrotaea hsiyai*. *Hydrotaea hsiyai* is closely related to *Hydrotaea tuberculata* Rondani, 1866.

Both species share the following characters: the presence on lower katepisternum of a set of 3 strong and long (about as long as fore coxa length) setae; modified *tar2–1* with a tuft of setulae (in basal or apical part respectively); *t2* with 2 *pd* setae and a row of fine *p* setulae, without *ad*; *t3* with 1–2 *av*, 1 short *ad* and 1 *pd*.

These species differ as follows (males):

- Thorax and abdomen shining (greenish) black, without any pollinosity. In basal half *tar2–1* ventrally with a cluster of 4–5 elongated spinulose setulae and 6–7 fine curved hairs (Fig. 1F). *f2* with about 10 strong and long *pv* setae (1.5–2x as long as femur width), 5 more sparsely placed setae in basal half and a cluster of 5 more approximated setae in apical half, medially with a bare gap between the two clusters of setae. *t2* without elongated setulae on *a*-surface. *hsiai* Fan
- Scutum matt black, abdomen with thin but distinct grey dusting and a black median vitta. In apical half *tar2–1* ventrally with a cluster of 4–5 elongated spinulose setulae, without curved hairs (Fig. 1E). *f2* on *pv*-surface with a sparse row of 6–8 rather fine setae. *t2* on *a*-surface in apical 2/3 with a row of elongated setulae. *tuberculata* Rondani

The female of *Hydrotaea hsiyai* may also be reliably distinguished by the following set of characters: thorax and abdomen shining (greenish) black, without any pollinosity; fronto-orbital plate and upper paracal shining black; lower katepisternum with a set of 3 approximated medium strong setae, otherwise bare; *t2* with 2 *pd*; *t3* with 2 *av*, 1 short *ad* and 1 *pd*.

***Xestomyia atrox* Sorokina & Pont, 2011**

Fig. 1A

Xestomyia atrox Sorokina & Pont, 2011: 40. Type locality: Russia, Altai Republic.

Material examined. RUSSIA, *Altai Republic*: 1♂ 1♀, Aktash env., 50.326°N 87.739°E, 2600 m asl, 6.07.2016, leg. N. Vikhrev (ZMUM).

Remarks. The genus *Xestomyia* Stein, 1907 includes only five species all of which are confined to high altitudes in the mountains and plateaux of Central and East Asia and are scarce and rarely collected (Sorokina &

Pont 2011). Only one species of this genus is known from Altai Mts., *Xestomyia atrox* Sorokina & Pont, 2011, which was described from a single male collected from marmot burrows [Altai Republic, Chikhacheva range, upper Naryn-Gol river, 49.816°N 89.533°E, 2520–2600 m asl, 15–19.07.2009, V. Sorokina]. During an expedition to the Altai in July 2016, the additional material of this rare species including the previously undescribed female was collected.

Notes on male. The newly collected male fits the description of *Xestomyia atrox* Sorokina & Pont, 2011 except for only 2 *pv* setae on *t2* (the holotype has 3 *pv* on *t2*). The description of *Xestomyia atrox* (Sorokina & Pont 2011: 41) stated “*pra* 2 times as long as posterior notopleural seta”. It was an error and the holotype has *pra* 0.5x as long as notopleural setae.

Description of female. Body length 5 mm. Body black with distinct green shine.

Head: Frons wide, at level of anterior ocellus 0.37 of head width. Interfrontalia black; fronto-orbital plate and parafacial grey-brown, with a large shining black spot at level of insertion of antenna. Fronto-orbital plate with 7 strong setae: 3 inclinate in anterior half and 4 exclinate in posterior half; crossed interfrontal setae present and remarkably strong. Mouth-edge distinctly projecting. Arista very short pubescent. Palpus black. Proboscis slender and elongate, labella medium large.

Thorax: *Prst ac* in 2 rows, 2+3 *dc*. Notopleuron with 2 long setulae between notopleural setae. Katepisternal setae 1+1. Prealar seta strong, but short and 0.5x as long as notopleural setae. Meron and katepimeron bare. Wing with a slight brownish tinge; costa spinulose. Haltere black; calypters white.

Legs: *t1* with 1–2 *pv* setae below middle. *f2* with 4 strong *av* in basal half and 1 near apex; a complete row of about 10 *pv*. *t2* with 2 *pd*, 2(3) *pv*, 1 *ad*. *f3* with a complete row of 10 *av*, the setae stronger in apical half. *t3*: 3 *av* in apical half; a complete row of 7 *ad* of different length; 1 *pd* and 6–7 short spinulose *pd* around it.

Abdomen: Black, green shining, without any dusting.

Phaonia fusca (Meade, 1897)

Fig. 1B

Hydrophoria fusca Meade, 1897: 31. Type locality: United Kingdom, England, Lancashire, Silverdale (~54.17°N 2.82°W).

Spilogaster suspiciosa Stein, 1907: 324. Type locality: China, border of Xinjiang and Qinghai prov. Lectotype ♂, ZIN (designated by Zinovjev, 1990: 478; Pont, 2004: 89), **syn. nov.**

Phaonia fusca fusca (Meade, 1897); Zinovjev, 1990: 474.

Phaonia fusca suspiciosa (Stein, 1907); Zinovjev, 1990: 476.

Phaonia fusca ssp. fusca (Meade, 1897); Sorokina & Pont, 2010: 43; Sorokina *et al.*, 2016: 35.

Phaonia fusca ssp. suspiciosa (Stein, 1907); Sorokina & Pont, 2010: 43; Sorokina *et al.*, 2016: 35.

Phaonia fusca (Meade, 1897); Sorokina 2012a: 204.

Material examined. Lectotype of *Spilogaster suspiciosa*, ♀ (Fig. 1B): р Орогын Сыртын/ ю Наньшаня Гоби Рок Козлов 3–20.VII.95 (= CHINA, border of Xinjiang and Qinghai prov., S of Nanshan-Qilian Mts., ~ 39°N 94°E, 3–20.07.1895, leg. V. Roborovsky & P. Kozlov) (ZIN); Lectotypus *Spilogaster suspiciosa* Stein, 1907 design. Zinovjev 1989 (Zinovjev, 1990: 476). **Paralectotypes** of *Spilogaster suspiciosa*, 23♂♂ 7♀♀: 6♂♂ 3♀♀, the same label as the lectotype; 1♂, р. Дза-чю, 11000' Камъ, бас. Голубой Козлов. сер.IV01 (=CHINA, Sichuan prov., about 32.0°N, 99.5°E, mid April 1901, leg. P. Kozlov); 8♂♂ 3♀♀, р Бомын (Ичегын)/ св Цайдамъ, Гоби/ Рок Козлов кVI95 (=CHINA, Qinghai prov., E Tsaidam, Ichegyn R., 38.0°N 94.8°E, 3100 m asl, leg. V. Roborovsky & P. Kozlov, end of June 1895); 4♂♂ 1♀, Хабирга-оз. Бага цадамин, в. Цайд./ Рок Козлов 3–11.VI95 (=CHINA, Qinghai prov., E Tsaidam, Khabirga, Baga-tsaidamin Lake, 37.6°N 95.4°E, 3200 m asl, 3–11.06.1895, leg. V. Roborovsky & P. Kozlov); 3♂♂, х. Барун-Цзасака/ мет.ст., в. Цайдам/ Козлов. кон. VII01 (=CHINA, Qinghai prov., Tsaidam, 36.2°N 97.4°E, 2800 m asl, end of July 1901, leg. P. Kozlov); 1♂, Курлык, Баингол/ вост. Цайдамъ./ Рок Козлов 28V95 (=CHINA, Qinghai prov., E Tsaidam, Kurlyk=Keluke Lake, Baingol R., 37.3°N 96.9°E, 2850 m asl, 28.05.1895, leg. V. Roborovsky & P. Kozlov) (all in ZIN). RUSSIA, Altai Republic: 14♂, Kosh-Agach env., 50.0°N 88.6°E, 1750 m asl, 2–4.07.2016, leg. N. Vikhrev (ZMUM). UNITED KINGDOM, 1♂, England, Kent, Pegwell Bay (51.30°N 1.35°E), 4.08.1954, leg. E.A. Fonseca (ZIN).

Remarks. The exact localities of *Spilogaster suspiciosa* were identified using the reports by Roborovsky (1949) and Kozlov (1947) on their expeditions to Central Asia.

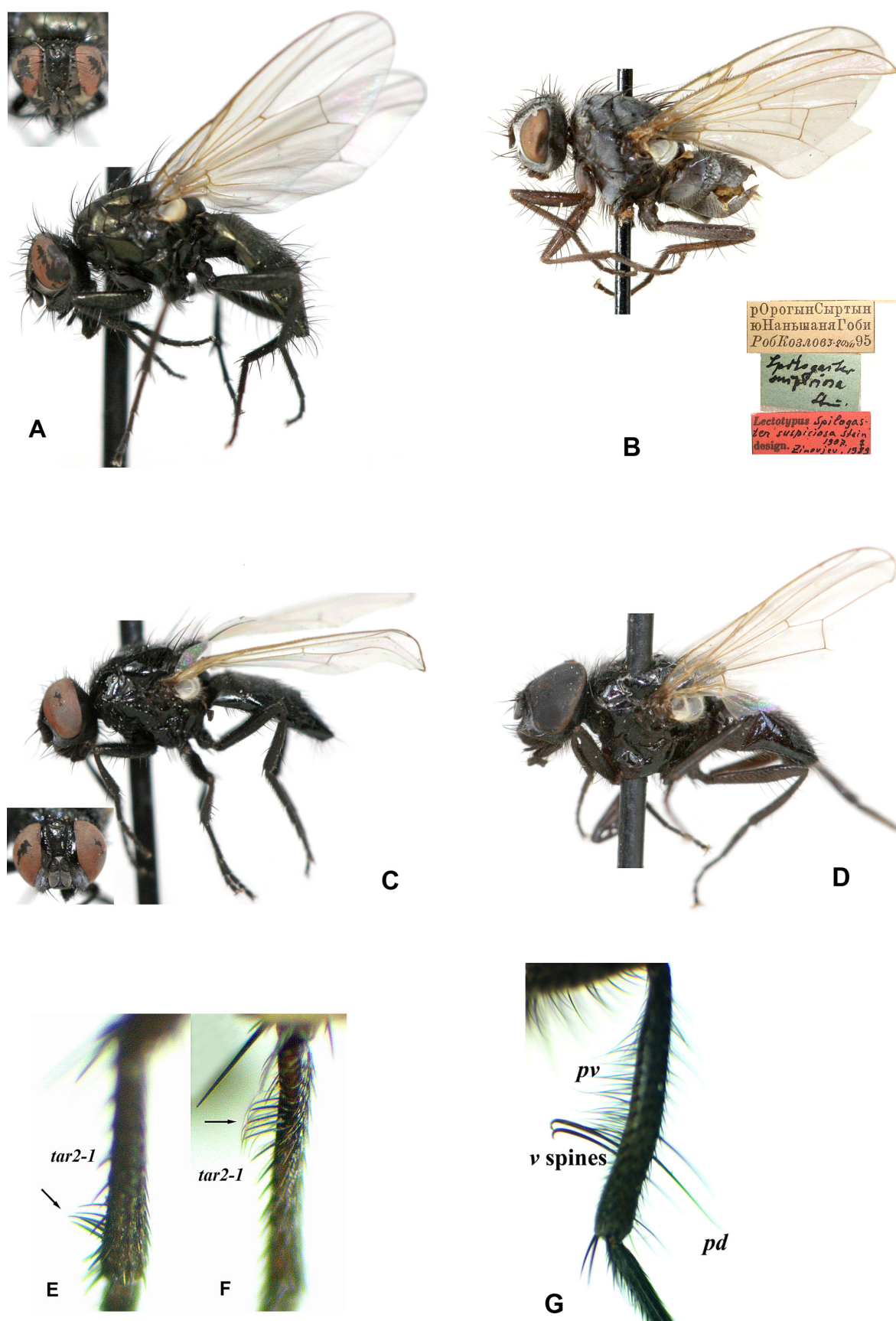


FIGURE 1. A. *Xestomyia atrox* (female). B. *Phaonia fusca* (female, lectotype of *suspiciosa* Stein). C, D, F. *Hydrotaea hsiai*: C. Female. D. Male. F. Male mid tarsomere 1. E. *Hydrotaea tuberculata*, male mid tarsomere 1. G. *Thricops aduncus*, male hind tibia.

Synonymy. Hennig (1963: 786) recommended separating *Phaonia fusca* and *Phaonia suspiciosa* as follows:

- Orbital setae only slightly shortened up to the ocellar triangle. *Ph. stackelbergi* & *Ph. suspiciosa*
- On the upper half of the orbits only fine setulae are present. *Ph. fusca* & *Ph. boleticola*

This key is correct in case of *Phaonia stackelbergi* Hennig, 1963 but not in the case of *Phaonia suspiciosa*, which has only a few short and sparse setulae on the upper part of the fronto-orbital plates, and sometimes the upper part of the fronto-orbital plates is even bare. Zinovjev (1990) found males of *Phaonia suspiciosa* and *Phaonia fusca* indistinguishable, but he divided the females into two subspecies, *Phaonia fusca fusca* and *Phaonia fusca suspiciosa*, by the fine structure of the ovipositor. In our opinion this difference is unconvincing. The division of *Phaonia fusca* into two subspecies might have some justification on the basis of their disjunctive distribution: *Phaonia fusca fusca* is known from NW Europe, whereas *Phaonia fusca suspiciosa* inhabits Central Asia. However, according to Zinovjev (1990) female specimens from Central Asia have the ovipositor of either the *suspiciosa*-type or the *fusca*-type. We therefore assume the differences in the ovipositor to be intraspecific variability, and we place *Phaonia suspiciosa* (Stein, 1907) as a new junior synonym of *Phaonia fusca* (Meade, 1897).

***Coenosia demoralis* Hockett, 1965**

Fig. 2

Coenosia demoralis Hockett, 1965: 170, 171 (key) and 172. Type locality: Churchill, Manitoba [Canada].

Descriptive notes: Our specimens agree with Hockett's description. It is necessary only to add some characters: postpedicel completely intensively yellow or brownish in apical half; gena broad, height of gena 2 times width of postpedicel; scutum grey without longitudinal stripes; *f*₂ with 2 long *pv* setae in basal half; *t*₂ with distinct *ad* seta (short in males and long in females) and 1 *pd* seta; *t*₃ with 1 strong *ad* seta in middle, without *pd* setae (one male has 1 short *pd* on one leg).

This species can be incorporated into the recent key to Siberian *Coenosia* (Sorokina, 2009: 6) as follows:

- 14 couplet as in Sorokina (2009)
- 14a Mid femur without a strong anterior seta; gena distinctly broader than postpedicel; abdomen blackish at base, without yellow marks. Male: mid tibia with a short but distinct anterodorsal seta, last tarsomere yellow or brown at apex. Female: tarsi brownish-yellow *demoralis* Hockett
- Mid femur without a strong anterior seta; gena not broader than postpedicel, equal to or narrower than its width; abdomen yellow or partly so at base. Male: mid tibia without short anterodorsal seta, last tarsomere completely black. Female: all tarsi completely black 15

Discussion

The Diptera fauna of the Altai Republic is remarkably rich. This is not just our opinion based on the family Muscidae but is also the opinion of our colleagues [pers. comm.: A. Ozerov (Scathophagidae, Sepsidae), D. Gavryushin (Limoniidae), A. Barkalov (Syrphidae)]. In the first place, the great diversity of the Altai fauna has a geographical basis. The Altai Republic borders in the west with the Eurasian steppe and forest-steppe zones, in the north and north-east with the vast Siberian taiga zone, and in the south-east with the elevated semideserts of Central Asia. The Altai Republic itself is divided into the relatively humid and forested western and northern parts, the variable central part from humid to very arid, and the cold and arid elevated south-eastern part. The Altai Mountains have a full range of altitudinal zonation from steppe lowlands and foothills to the nival zone. Under the present climatic conditions, the fauna of the South-East Altai seems to be the most exotic because of the presence of species previously known from Middle Asia, Mongolia and North-West China, such as *Hydrotaea hsiai* Fan, 1965, *Phaonia fusca* (Meade, 1897), *Mydaea asiatica* Pont, 1967, *Coenosia subgracilis* Xue & Cui, 2001.

However, during glacial periods the Altai was surrounded by forest-tundra or tundra-steppe landscapes with the Diptera fauna remaining in the subarctic belt of Eurasia and North America. With postglacial climate warming,

the subarctic fauna moved northwards from South Siberia but much of it found suitable conditions in the Altai because of the altitudinal zonation and the wide range of humidity in different localities. In this and in previous papers several Nearctic species have been recorded for the first time either from the Altai or from Palaearctic in general: *Thricops aduncus* Savage, 2003, *Drymeia firthiana* (Huckett, 1965), *Drymeia setibasis* (Huckett, 1965), *Helina bispinosa* Malloch, 1920, *Spilogona humeralis* Huckett, 1965 and *Coenosia demoralis* Huckett, 1965.

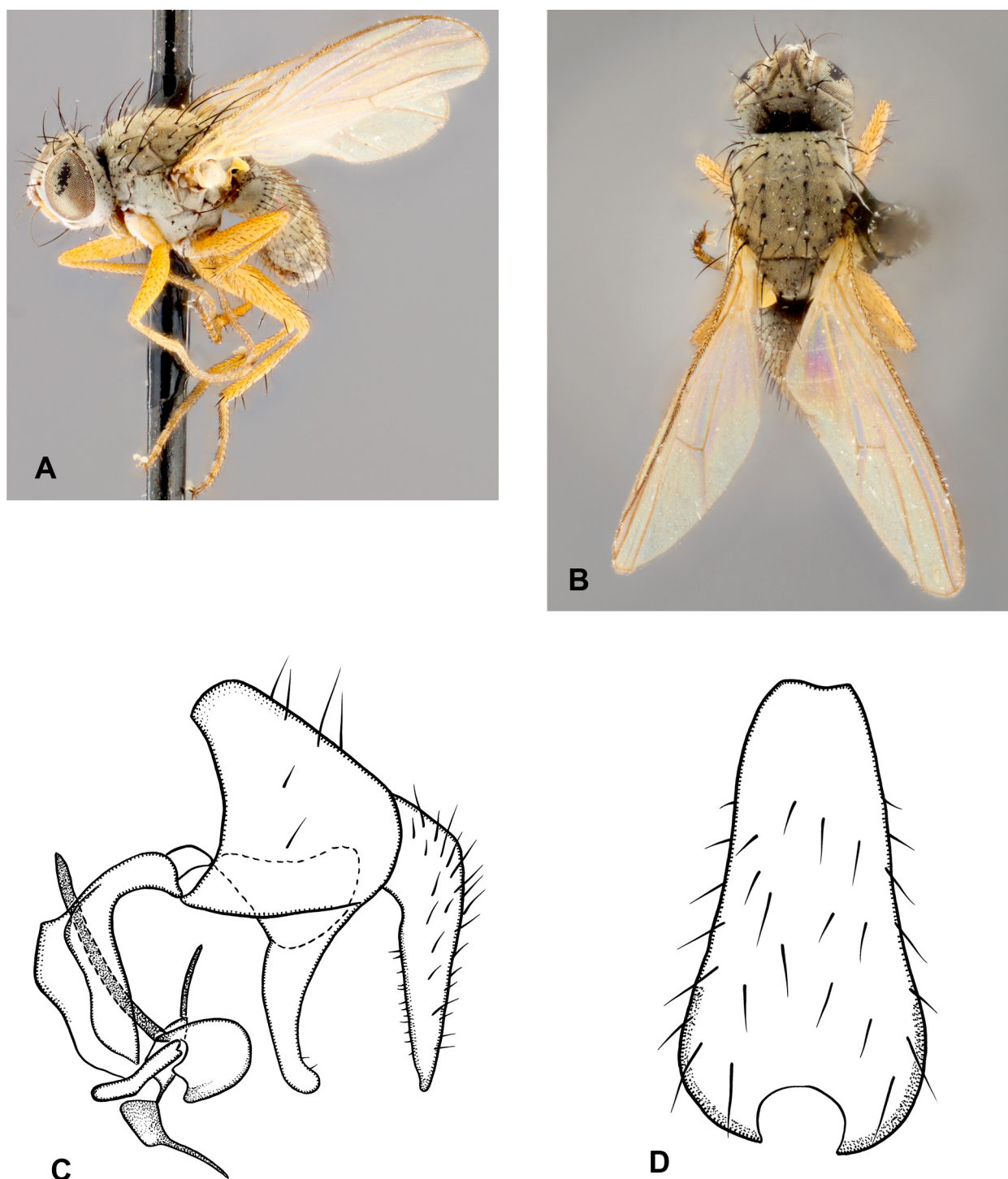


FIGURE 2. *Coenosia demoralis*, male. **A.** Holotype, lateral view (photo: Shannon Henderson). **B.** Holotype, dorsal view (photo: Shannon Henderson). **C.** Terminalia, lateral view. **D.** Cercal plate, dorsal view.

There are also historical reasons. On the one hand, the Altai Republic still is a thinly populated region without large-scale industry and, due to its harsh climate and mountainous relief, with very limited agriculture. On the other

hand, the Altai Republic is a region with animal husbandry still practised everywhere. Freely grazing horses, cattle, sheep, goats and yaks provide the best approximation to the former landscape populated by wild horses and aurochs, and so the complex of insects associated with herbivorous animals and their dung remains as intact in the Altai Republic as it is currently possible. This complex is represented by following species: *Azelia monodactyla* Loew, 1874, *Azelia aterrima* (Meigen, 1826), *Hydrotaea atrisquama* Ringdahl, 1925, *Hydrotaea parva* Meade, 1889, *Thricops foveolatus* (Zetterstedt, 1845), *Polietes major* (Ringdahl, 1926), *Polietes steinii* (Ringdahl, 1913), and *Gymnodia polystigma* (Meigen, 1826).

The comparison of the 231 species recorded from the Altai Republic with the 282 species of Muscidae previously recorded from the boundless expanse of Siberia (Sorokina & Pont 2010) shows both how rich the fauna of Altai is and how poorly Siberia is known at present.

Acknowledgements

For study facilities in ZIN and for making the collection available for study, we thank Olga Ovchinnikova, Galina Suleymanova and Ludmila Kuznetsova (ZIN, St Petersburg). We are grateful to Shannon Henderson (Canada, Ottawa) for taking the pictures of *Coenosia demoralis*. We thank Oleg Kosterin (Novosibirsk) and Adrian Pont (Oxford) for their advices and corrections. The research presented in this paper was supported by the Federal Fundamental Scientific Research Programme for 2013–2020, the project No. VI.51.1.5.

References

- Fan, Z.D. (1965) *Key to common flies of China. First edition*. Science Press, Beijing, XV + 330 pp. [in Chinese]
- Hennig, W. (1963) Muscidae. [Part, Lieferung 233.] In: Lindner, E. (Ed.), *Die Fliegen der palaearktischen Region. Vol. 63b*. Schweizerbart, Stuttgart, pp. 769–816.
- Huckett, H.C. (1965) The Muscidae of Northern Canada, Alaska and Greenland (Diptera). *Memoirs of the Entomological Society of Canada*, 42, 1–370.
<https://doi.org/10.4039/entm9742fv>
- Kozlov, P.K. (1947) *Mongolia and Kham. Three-year long journey to Mongolia and Tibet (1899–1901)*. 2nd Edition (Reduced). OGIZ, Moscow, 437 pp. [in Russian]
- Meade, R.H. (1897) *Descriptive list of the British Anthomyiidae*. Part One. Gurney & Jackson, London, 39 pp.
- Pont, A.C. (2004) Notes on types of Fanniidae and Muscidae (Diptera) in the Zoological Institute of the Russian Academy of Sciences, St Petersburg. *International Journal of Dipterological Research*, 15, 73–98.
- Roborovsky, V.I. (1949) *Traveling to East Tian Shan and Nan Shan. Transactions of the expedition of Russian Geographical Society in Central Asia in 1893–1895*. 2nd Edition (Reduced). OGIZ, Moscow, 490 pp. [in Russian]
- Savage, J. (2003) Revision of the genus *Thricops* Rondani (Diptera: Muscidae). *Insect Systematics and Evolution*, 61 (Supplement), 1–143.
- Sorokina, V.S. (2009) A key to Siberian flies of the genus *Coenosia* Meigen (Diptera, Muscidae) with the descriptions of three new species. *Zootaxa*, 2308, 1–28.
- Sorokina, V.S. (2012a) Fauna of Muscidae (Diptera) of the Altai Mountains. *Proceedings of the Russian Entomological Society*, 83 (1), 193–222. [in Russian, with English abstract]
- Sorokina, V.S. (2012b) The Muscidae (Diptera) of the Russian tundra zones. Report 1. *Caucasian Entomological Bulletin*, 8 (2), 328–332. [in Russian, with English abstract]
- Sorokina, V.S. (2014) To the taxonomy of the genus *Coenosia* Meigen 1826 (Diptera, Muscidae) in the fauna of Russia, with a description of *Coenosia tschernovi* sp. n. *Zoologicheskii zhurnal*, 93 (1), 196–204. [in Russian, with English abstract. English translation in *Entomological Review*, 94 (4), 630–638.]
- Sorokina, V.S. & Pont, A.C. (2010) An annotated catalogue of the Muscidae (Diptera) of Siberia. *Zootaxa*, 2597, 1–87.
- Sorokina, V.S. & Pont A.C. (2011) Fanniidae and Muscidae (Insecta, Diptera) associated with burrows of the Altai Mountains Marmot (*Marmota baibacina baibacina* Kastschenko, 1899) in Siberia, with the description of new species. *Zootaxa*, 3118, 31–44.
- Sorokina, V.S. & Pont, A.C. (2015) A review of the genus *Drymeia* Meigen, 1826 (Diptera: Muscidae) in Russia. *Zootaxa*, 4000 (2), 151–206.
<https://doi.org/10.11646/zootaxa.4000.2.1>
- Sorokina, V.S., Bagachanova, A.K. & Zikov, E.N. (2016) A preliminary list of the Muscidae (Diptera) of Yakutia, Russia. *Euroasian Entomological Journal*, 15 (1), 29–39. [in Russian, with English abstract]
- Stein, P. (1907) Zur Kenntnis der Dipteren von Central-Asien. II. *Cyclorrhapha schizophora schizometopa*. Die von

- Roborowsky und Kozlov in der Mongolei und Tibet gesammelten Anthomyiiden. *Ezhegodnik Zoologicheskago Muzeya Imperatorskoĭ Akademii Nauk*, 12, 318–372.
- Vikhrev, N.E. (2011) Review of the Palaearctic members of the *Lispe tentaculata* species-group (Diptera, Muscidae): revised key, synonymy and notes on ecology. *ZooKeys*, 84, 59–70.
<https://doi.org/10.3897/zookeys.84.819>
- Vikhrev, N.E. (2015a) Review of the world fauna of the genus *Azelia* (Diptera, Muscidae). *Amurian Zoological Journal*, 7 (1), 33–42.
- Vikhrev, N.E. (2015b) Review of the *Hydrotaea parva* and *Hydrotaea glabricula* groups (Diptera: Muscidae). *Russian Entomological Journal*, 24 (1), 93–102.
- Vikhrev, N.E. & Gomyranov, I.A. (2014) Taxonomic and faunistic notes on *Hydrotaea unispinosa* Stein, 1898 (Diptera: Muscidae). *Russian Entomological Journal*, 23 (3), 223–225.
- Xue, W.-Q., Wang, M.-F. & Du, J. (2007) The genus *Hydrotaea* Robineau-Desvoidy in China, with a description of four new species (Diptera: Muscidae). *Journal of the Kansas Entomological Society*, 80 (4), 281–297.
[https://doi.org/10.2317/0022-8567\(2007\)80\[281:tghric\]2.0.co;2](https://doi.org/10.2317/0022-8567(2007)80[281:tghric]2.0.co;2)
- Xue, W.-Q., Wang, M.-F. & Wang, D.-D. (2007) The genus *Hydrotaea* (Diptera: Muscidae) from China, with description of three new species. *Oriental Insects*, 41, 273–291.
<https://doi.org/10.1080/00305316.2007.10417512>
- Zinoviev, A.G. (1990) On the fauna of Phaoniini (Diptera, Muscidae) of Mongolia. II. Genera *Lophosceles* Ringdahl and *Phaonia* Robineau-Desvoidy. In: *Insects of Mongolia. Vol. 11*. Leningrad, Nauka, pp. 471–514. [in Russian]